



## **Gaza Analysis Mission**

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**Gary Morris - Iveson**

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## Acronyms

ACF	Action Contre La Faim
CARE	Christian Action Research and Education
CfW	Cash for Work
CHF	Cooperative Housing Foundation
CIDA	Canadian International Development Agency
COOPI	Cooperazione Internazionale (Italian NGO)
DfID	Department for International Development (British Government Aid)
ECHO	European Commission Humanitarian Aid Office
EOD	Explosive Ordnance Disposal
GLUE	Governance, Livelihoods, Utilities & Environment
GTZ	German Technical Assistance
IDP	Internally Displaced Person
INGO	International Non-Government Organisation
JICA	Japanese International Cooperation Agency
LNGO	Local Non-Government Organisation
MoH	Ministry of Health
MSB	Swedish Civil Contingencies Agency
NRC	Norwegian Refugee Council
SIDA	Swedish International Development Cooperation Agency
SWM	Solid Waste Management
UNDP	United Nations Development Programme
UNFAO	United Nations Food and Agriculture Organization
UNMAT-GO	United Nations Mines Action Team-Gaza Office
UNRWA	United Nations Relief and Works Agency
USAID	United States Agency for International Development
UXO	Un-Exploded Ordnance

# 1. Solid Waste Management

## 1.1 Overview

The challenge of managing solid waste, in terms of household, medical, business (e.g. market places) and manufacturing waste, is a problem not directly linked to the December 2008 offensive, but one which has been made more difficult as a result of it. Damage to collection vehicles and lack of access to the landfill site has resulted in an additional burden on existing infrastructure, which has led to dumping of waste at unofficial sites, a build-up of waste at existing dumpsites and ad hoc burning of waste. While the quantity of waste generated and general waste practices remain similar to before the offensive, the conflict has led to further stress upon the systems that were already insufficiently resourced. This is resulting in an increased public health risk to the population as a result of public health practices. Further, the continued influx of people living in the IDP camps throughout the Gaza Strip has led to further stress on services.



The management of waste falls within the remit of the Municipal Councils, bodies which do not have the funding or equipment to fulfil this responsibility adequately. This effort is supplemented by INGOs and LNGOs, though these are few. SWM activities consist exclusively of waste collection from households, communal areas, market places and hospitals, transferring this waste to a central waste transfer station (in reality an unmanaged dumpsite in the city centre) and from there onto larger vehicles for transfer to the landfill.

## 1.2 Waste Collection Actors

Agency	Project	Location
<b>Municipal Council</b>	150 municipal donkey and cart combinations and 20 vehicles for community collection and transfer to landfill.	Gaza City
<b>COOPI</b>	Supply of 150 donkey and cart combinations and related labour for household collection	Gaza City
<b>Solid Waste Management Council</b>	Report collection of household waste benefitting 200,000 people using roadside skips and vehicle transfer to landfill	Beit Hanun, Beit Lahiya, Jabalya
<b>Rafa Municipality</b>	Small amount of vehicles running community collection covering less than 50% of households	Rafa, not including IDP camps
<b>Khan Yunis Municipality</b>	Small amount of vehicles running community collection covering less than 50% of households	Khan Yunis, not including IDP camps

### 1.3 Landfill Facilities and Dumpsites

There appears to be only one engineered landfill, located at Juhur ad Dik around 15 minutes drive south of Gaza City. The facility was designed and built with support from GTZ and consists of an engineered landfill with leachate collection and treatment. It was not possible to visit the site due to security concerns, but it is reported that the facility has less than 2 years capacity left at present dumping rates. As a result of the recent offensive this site has been declared as being within the extended Israeli border buffer zone and, as a result, is subject to sporadic closure. As vehicles carry out daily transfer to the landfill they have been forced to off-load at sites nearby. The recipient of most of this waste has been the nearby water treatment plant, which has hosted around 50mT of solid waste for a period of weeks.

Dumpsites exist in each main urban area and are unplanned and largely unmanaged insanitary facilities. These facilities are used for waste transfer from the donkey and cart collection vehicles to the larger capacity skip trucks for transport to the landfill site. However, waste is spread across all available areas and as a result remains at the site for several days. The sites are invariably located near public facilities (e.g. schools, libraries), market places and other businesses, causing a public health threat. Scavengers (usually young boys) operate at the sites, sifting through fresh waste and opening bags as it arrives in search of plastic which will be sold to the plastic recycling factories.

Disposal of waste at insanitary dumpsites, with the connected threats to the health of scavengers at these and other waste locations, provide the main threat to public health. As the waste at dumpsites in the centre of each large urban area and currently at the water treatment plant to the south of Gaza City sits at these locations for several days, and in the case of the water treatment plant many weeks, ground and groundwater pollution are certain to be taking place. The level and extent of this contamination is difficult to estimate as there is no data on groundwater contamination. However, it is fairly safe to assume that scavengers at dumpsite are at considerable risk of hepatitis and HIV infection from contaminated medical waste. The increase in vermin and therefore disease carriers in the dumpsite localities is also difficult to estimate without data but will be considerable in adjacent communities.

### 1.4 Clinic Waste Disposal



There are 4 hospitals in Gaza City operated by the MoH and around 100 clinics of various sizes. A clinical waste management plan does exist for the safe disposal of clinical waste from the hospitals and is largely followed at these sites. Smaller clinics however do not follow these procedures rigorously enough. Clinical waste at the 4 hospitals is separated from non-clinical waste and is collected in stronger black plastic bags for transfer to incineration. There are 3 incineration units in the city, though the standard of these needs to be ascertained. However, there is some cross-over between disposal of non-

clinical and clinical waste resulting in sharps and infectious materials turning up at the municipal waste dumps. Though more robust than normal plastic bags, hospital waste containers do not identify their contents as infectious. Moreover, these bags become a target for scavengers searching for plastic as they contain a higher quantity of plastic than the average household waste bags. Scavengers with no protective gloves and clothing are therefore at great risk of infection at these sites.

Other urban areas of Gaza have a similar problem of lack of separation between household waste and clinical waste.

### **1.5 Recycling**

There appears to be only one waste recycling stream operating, that of medium density plastic, under the coordination of the Palestinian Federation of Industries. The two plastic recycling industries visited operate based on plastic inputs from both individuals (largely through scavenging at municipal dumpsites and locally) and direct purchase from companies discarding plastic-based furnishings. Purchase from individuals covers around 70% of plastic input required at the Mahani Brothers Company in Jabalya, who pay between ILS1 and ILS3 (US16 cents and US50 cents) per kg. The output from this factory is plastic pipes, sold primarily to the Water Board. The factory runs at a production level of 700kg of piping per day, and can produce gauges between 16mm and 110mm. Regular power cuts (estimated at an average of 2 to 3 hours per day) and the lack of plastic inputs means that the factory uses only 2 of its 8 machines.

Another use of recycled plastic is at the Modern Industry Company in Khan Yunis, which again relies on discarded and purchased plastic inputs. This factory produces children's toys and runs at around 50% capacity. There are around 20 such factories in Gaza, producing pipes, plastic containers and water tanks.

### **1.6 Composting**

No composting production projects were apparent during the mission. In Gaza City 100% of waste collected, minus perhaps between 2% and 5% of plastic content collected for recycling, goes into the landfill at Juhor ad Dik. Palestinian Friends of the Environment, a LNGO chaired by Professor Afifi of the Islamic University, has conducted a couple of small composting projects in Khan Yunis as pilot projects and therefore has a level of experience of compost production in the Gaza environment. One or two INGOs have planned projects in SWM, but have tended to rely on equipment and vehicles as part of the solution, none of which are currently allowed into Gaza and as a result these projects are currently stalled.

## **2. Rubble Collection and Recycling**

### **2.1 Overview**

There are estimated to be 600,000 Tonnes of rubble in the Gaza strip, with 15,000 homes having been damaged or destroyed and extensive damage to factories located on the northern edges of Gaza City in the area of Jabalya. It was not possible to verify these figures during this visit, but most agencies operating in Gaza quote this data. It was however possible to verify the almost complete destruction of the factories and nearby houses in the Jabalya area.

Rubble removal in the immediate aftermath of the December to January 2009 bombing were characterised by a lack of official direction regarding storage locations and a random depositing of rubble removed from access roads and residential and business areas along roadsides and in vacant lots. There has been no discernible movement of rubble since those early weeks.



To date there is little evidence of rubble recycling projects being implemented, largely as a result of the complexity of working in Gaza but to some extent also a result of the reliance on equipment and vehicles not currently available in the Gaza Strip and, as a result of the current blockade, unlikely to become available in the near future.

Information from the international agencies it was possible to meet or talk to (see attached meetings and contacts list) shows that all have projects planned for rubble collection using CfW techniques which will result in rubble provision to the UNDP project of crushing. UNDP, as the GLUE Cluster Coordination body and main player in the rubble recycling sector, plan to crush the supplied rubble to specifications suitable for road-base material. Agencies then expect that this process will lead to new and improved agricultural roads across the Gaza Strip.

## 2.2 Actors and Projects

Agency	Project	Location
UNDP	Sector coordination. Centralised rubble crushing and transport.	Gaza Strip
UNRWA	Support to job creation through CfW	Gaza Strip
NRC	Small-scale rubble collection to be sent to the UNDP crusher project	Rafa and Khan Yunis
Mercy Corps	Collection from 400 damaged homes through CfW. No current plans to transport rubble after collection	Southern Gaza Strip
CHF	Large project of rubble collection through CfW, to be sent to UNDP crusher project and used for agricultural road construction and rehabilitation	Gaza Strip
Islamic Relief	Completed rubble collection project in March09 aimed at providing access to residents	North Gaza

### 3. Safety and Security

UNMAT-GO provide support to implementing agencies in Gaza and have a capacity involving 7 EOD Technicians and 5 EOD Teams available. The main threats apparent concern those from UXOs (normally estimated at 10% of total munitions used), anti-tank mines (used as bolt charges to destroy buildings) and white phosphorous. There are additional threats to agencies, particularly those engaged in rubble clearance, from unstable partially destroyed buildings.

UNMAT describe their operation of consisting of 4 phases:

Phase 1: Risk assessment of sites which agencies plan to work at

Phase 2: UXO safety awareness training

Phase 3: EOD support during activities

Phase 4: Post clearance certification

From discussion with the UNMAT team and implementing agencies it was clear that there is a gap in understanding between the two resulting in some confusion and potential delays in implementing projects. UNMAT require that agencies inform them in advance of projects getting underway, giving them enough time for risk assessment and to plan training needs, while implementing agencies have the expectation the UNMAT will clear areas of the Gaza Strip ahead of project commencement. There is therefore a need for clear communications between the two and shared planning.

### 4. Potential Donors

Donor	Projects	Level of interest
ECHO	Currently funding COOPI for household solid waste collection	COOPI are interested in expanding their SWM operation to encompass composting activities
DfID	Currently funding through the UN agencies and Mercy Corp	Reduced administration staff recently and therefore not in a position to fund smaller projects, though funding is available
JICA	Funded the training in Japan of municipal Council staff	Unlikely to fund direct implementation projects but worth further exploration
SIDA	Currently funding the provision of expert personnel to the UN	MSB approaching for funding for workshop. This route will also be explored for project funding though the UN system
CIDA	Recently agreed large donation to UNDP for rubble projects	Not contacted as yet
USAID	Funded the provision of waste collection vehicles for the Gaza Municipality in 2008	Not contacted as yet
UNDP	Confirmed \$15 m funding from CIDA for rubble projects. Plans for centralised rubble crushing facilities for agencies and for	Programme Manager in Gaza confirmed interest in joint sea wall/fish farm project linked to harbour wall rehabilitation project, and in solid waste

	agricultural road projects	composting project for which they will investigate the possibility of access to \$300,000 internal funding. Willing to take concept to donors and internal UN mechanisms
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## 5. Recommendations

### 5.1 Overview of Recommendation

	Gap	Recommended Action	DWR Involvement
<b>Rubble Recycling</b>			
A	Coordination between agencies and UNMAT	Provide UNMAT with the opportunity at the May09 workshop to present their plans and requirements	Facilitate workshop
B	Rubble recycling projects and lack of technical capacity amongst actors	Sea wall construction Fish farm construction Fishermen's livelihoods training	Manage design process Training provision Project monitoring Project documentation
<b>Solid Waste Management</b>			
C	Composting	Feasibility study Low-tech, labour intensive, composting project Business case development	Manage design process Manage feasibility study Develop business case Training provision Project monitoring Project documentation
D	Recycling of plastics	Improvements in dumpsite management and implementation of a composting project in Gaza City will produce improved plastic collection. Feed collected plastic into existing recycling businesses.	Project monitoring Project documentation
E	Collection in urban areas outside of Gaza City and extension to composting project	Analysis of current collection systems Feasibility study Implement new collection system Composting project Business case development	Undertake analysis of collection systems Manage design process Manage feasibility study Develop business case Training provision Project monitoring Project documentation

## **5.2 Gaps – Solid Waste Management**

### **Gaza City Solid Waste Management Project**

#### **Background**

Collection of waste in Gaza City has been improved through the provision of 150 donkey and cart units by COOPI to the Gaza Municipal Council. The solid waste collection system now covers in excess of 90% of the household population of the city. 100% of collected waste (minus scavenged plastic removal at the dumpsite) is deposited at the landfill site outside of Gaza City, which has less than 2 years of capacity remaining.

In addition to the solid waste situation, the agricultural sector in the Gaza Strip has been negatively affected by the recent imposition of a broad blockade of many goods entering the Strip. One of the items limited by the blockade is fertiliser. This has resulted in both a reduction in available suitable quality fertiliser and a large increase in the cost of that which is available, which is generally of poorer quality.

#### **Project**

It is therefore recommended to undertake a composting project as an extension to COOPI's solid waste management activities. The project would involve undertaking, with technical support from DWR, a feasibility study and business case analysis of the composting potential from waste in Gaza City. Data would be collected on waste volumes, sources and content, thereby filling a gap in available information to the sector. The project would then aim to provide a composting facility, based on low-technology, labour intensive, processing, and would involve a partnership with Palestinian Environmental Friends, an NGO set up and Chaired by Dr Afifi of the Islamic University which has experience of small-scale composting projects in the Gaza Strip and the monitoring and testing facilities required for high quality compost production. Technical inputs, design and training would be provided by DWR, with on-the-ground management provided by COOPI. The project would use previously tried and tested labour-intensive composting technology, aim to sell high quality compost to Gazan farmers at below current market rates and its strategy will be to run as a business within one year of setup.

On-the-ground technical management of the project would be provided through secondment of a low-technology composting expert provided by MSB and coordination would be achieved through a close relationship with UNDP, as Lead GLUE Cluster Coordinator. A by-product of the project would be improved plastic collection and this would be supplied directly to a selected plastic recycling business in Gaza City. This agreement would be used to advise improvements in health and safety practices in the business chosen. The project would also look to work with COOPI and the Municipal Council to implement source separation of clinical waste from hospitals and clinics throughout Gaza City and to ensure 100% of this waste is disposed of in a safe way.

This project would be used as a pilot for future waste collection and composting projects in other urban areas of the Gaza Strip and would require full documentation and communication.

### **5.3 Gaps – Rubble Recycling**

#### **Fish Farm Project**

##### **Background**

The rubble collection and recycling sector has a wide range of actors, a level of funding already secured and is being coordinated by UNDP. Each agency planning to undertake rubble collection has plans for agricultural road construction/repair projects implemented either directly or through UNDP. UNDP is coordinating the end-use projects for rubble recycling and also has funding for rubble recycling projects.

In accordance with the Oslo Accord of 1993 Gazan fishermen are permitted to fish waters up to 20 miles from the coast. However, in practice they have been limited to within 3 miles of the coast for some time. This has resulted in a considerable overfishing of the coastal Gaza Strip, reducing fish stocks and directly affecting the livelihoods of fisher and associated communities. The effect of this overall reduction in the availability of fish on the Gazan population has been to reduce income, pushing up market prices and negatively affecting the nutritional status of a population who rely on fish as a staple part of their diet.

In 1997 a Gaza Harbour wall was constructed from available rubble. The project was undertaken without suitable consideration for sea conditions and using poor construction techniques. This has resulted in a degradation of the outer wall and sedimentation within the harbour zone. The harbour has also negatively affected beach areas adjacent to the harbour.

##### **Project**

As the amount of rubble available for recycling projects is large, and in response to the limited range of recycling projects put forward, it is recommended that a sea wall and fish farm project be developed. A sea wall from rubble project has been successfully implemented in other parts of the world, notable following the Asian tsunami of 2004, and would tap into this learning. In addition, a Marine Specialist would be required to advise on wall design.

This project could be tied to the harbour wall rehabilitation project proposed by UNDP through the contracting of a Marine Specialist, who could combine sea wall design with advice on harbour wall rehabilitation. The project would combine technical input and monitoring from DWR, the possibility of a Marine Specialist deployed through MSB, on-the-ground management through UNDP and fisher livelihood advice and support from UNFAO.

Siteing for the project needs to take account of the fact that raw sewage is discharged into the sea at points along the coast. It is therefore recommended that sea conditions along the coast are researched and it is expected that the project would be between Gaza City and Khan Yunis.

## **Acknowledgements**

Arranging such a mission when you do not have experience in the country and your organization does not have a base there is a complicated process. This mission would therefore not have been possible without the considerable logistical assistance given by ACF Jerusalem and Gaza. Accommodation provided to me by COOPI was also very much appreciated and well located. Support from Unicef and Oxfam in setting up appropriate meetings and information provision was also invaluable. And overall, the huge good will, openness and support of everyone I met contributed to making this mission a very positive one, the success of which I very much hope will be judged as positive in the near future.

## **List of Attachments**

- a. Mission Terms of Reference
- b. Meetings and contacts list
- c. Map of Gaza fishing zones
- d. Extract of EU Gaza Assessment Report (unpublished) - Rubble
- e. Extract of EU Gaza Assessment Report (unpublished) – Solid Waste